

<b>Office Action Summary</b>	<b>Application No.</b> 10/665,138	<b>Applicant(s)</b> DOUCET ET AL.	
	<b>Examiner</b> Marcia A. Golub	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15, 17-37, 39, 40, 44, 45, 49, 50, 53-55, 57, 58, 60, 61, 63 and 64 is/are pending in the application.
- 4a) Of the above claim(s) 4, 5, 10-14, 23-27, 35 and 36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9, 15, 17-22, 28-34, 37, 39, 40, 44, 45, 49, 50, 53-55, 57, 58, 60, 61, 63 and 64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 9/27/07 have been fully considered but are moot in view of new grounds of rejection.

The indication of allowability of claims 1, 22, and 34 is withdrawn in view of newfound references.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**Claims 58, 61 and 64** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification and Fig 11 disclose the Er-Yb doped fiber to be 8 cm long, while the actual gain medium defined by superstructure gratings is only 2 cm long. Therefore the applicant's claim that "the ratio of the number of wavelength to the length of the gain medium is at least 1 wavelength per cm of gain medium" is not supported by the original specification, since  $8/2=4$  and  $15/2=7.5$ .

Furthermore, the specification discloses the length of the fiber to be 8 cm with an output of 8 or 15 wavelengths, depending on the length of the grating. The ratio of the number of wavelength to the length of the fiber therefore is equal to 1 ( $8/8=1$  or  $15/8=1.8$ ), not greater than or equal to 1. This number is specific data points and cannot be described as open ended ranges ("at least 1"), since there is no evidence to indicate that the ratio can be any other number besides 1 and 1.8.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-3, 6-9, 15, 17-21, 22, 28-34, 37, 50, 60, 63** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ibsen et al. ("Robust high power all fibre DFB lasers with unidirectional and truly single polarization output" found in IDS), hereinafter Ref 1, and further in view of Town et al. ("Dual wavelength mode-locked fiber laser"), hereinafter Ref 2 and Town et al. ("Wide-band fabry-perot like filters in optical fiber" found in IDS), hereinafter Ref 3.

Regarding **claims 1, 2, 22 and 32**, Ref 1 discloses a multi-wavelength laser source comprising:

- a) a pump laser unit adapted for generating an energy signal [pump];
- b) a gain section including a homogeneously broadened gain medium comprising rare-earth doped fiber [fibre] having an superstructure grating [two gratings shifted with respect to each other], said superstructure grating forming a plurality of cavities that are distributed in said gain medium such that different resonant wavelengths resonate in respective ones of said cavities when the energy signal is applied to said gain section, the pump laser unit being adapted for applying the energy signal to said gain section to cause a multi-wavelength laser signal to be generated;
- c) an output for emitting the multi-wavelength laser signal; (Applicant's disclosure describes the device of Ref 1 in ¶ 0032 of the PGPub)

Ref 1 does not disclose: "at least two of said cavities being separated from one another".

However, Fig 1 of Ref 2 discloses a multi-wavelength laser source that includes a comb filter (explained in detail in Ref 3) formed by overlapping two chirped gratings. Incorporating the comb filter into the gain medium of Ref 1 would create cavities formed

by gratings that are separated from one another. Both references are concerned with creating a multi-wavelength fiber laser using a homogeneously broadened fiber as a gain medium. Therefore it is obvious to combine them to make improvements in the art recognized problem.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Ref 2 into the device of Ref 1 by replacing the gratings of Ref 1 with a comb filter of Ref 2 for at least the purpose of producing a multi-wavelength output that is not limited to two wavelengths.

Regarding **claims 3, 6-9, 15, 17-21, 28-31, 33, 34, 37, 50, 60, 63**, Refs 1 and 2 further disclose:

3, 37. “wherein the gain section further comprises an amplifying section; [EDFA]

15. “wherein the gain medium is selected from the set consisting of erbium-doped glass; [EDFA]

17. “wherein said gain section includes an optical waveguide [optical fiber] ;

18. “wherein the optical waveguide includes an optical fiber;

19. “wherein said optical waveguide includes a waveguide core and a waveguide cladding; [inherent characteristics of optical fiber waveguide]

20. “wherein the superstructure grating is located in the waveguide core; (first ¶ of Ref 1)

21. “wherein the superstructure grating is located in the waveguide cladding; (first ¶ of Ref 1)

28. “An optical transmitter apparatus comprising the multi-wavelength laser source described in claim 1.” Intended use of the device recited in the pre-amble that does not result in a structural difference of the device does not distinguish the invention over prior art. (*see MPEP 2111.03*)

29. “A device suitable for providing optical components characterization comprising the multi-wavelength laser source described in claim 1. (*see MPEP 2111.03*)

30. “A device suitable for providing temporal spectroscopy functionality comprising the multi-wavelength laser source described in claim 1 (*see MPEP 2111.03*)

31. “A device suitable for providing material characterization for non-linear effects

comprising the multi-wavelength laser source described in claim 1 (see *MPEP 2111.03*)

33. “wherein the pump laser unit is positioned such as to generate the energy signal in a co-propagation relationship with the output; (Fig 1 of Ref 2)

34. “wherein the pump laser unit is positioned such as to generate the energy signal in a counter-propagation relationship with the output; (Fig 1 of Ref 2)

Second full paragraph on page 79 of Ref 3 discloses:

6. “wherein the superstructure grating comprises: a) a first grating segment; b) a second grating segment superposed at least in part on said first grating segment;

7. “wherein the first grating segment is a chirped Bragg grating;

8. “wherein the second grating segment is a chirped Bragg grating;

9. “wherein the first grating segment and the second grating segment are substantially similar to one another.”

57,60,63. “wherein each of said cavities has a length in a millimeter order of magnitude.” This limitation is inherent to the structure for two reasons: 1<sup>st</sup>, because the overlapping cavities are formed by the same method of superimposing two gratings and 2<sup>nd</sup>, because any length can be measured in millimeters.

**Claims 39, 40, 44, 45, 49, 50 and 53-55** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ref 1 and Ref 2 as applied to claims 1, 22 and 32 above.

Ref 1 and Ref 2 disclose a multi-wavelength laser source as described above, but do not disclose:

39,44,49. “wherein the multi-wavelength signal is characterized by at least 8 laser wavelengths”

40,45,50. “wherein the multi-wavelength signal is characterized by at least 15 laser wavelengths”

53-55. “wherein at least five of said cavities are separated from one another”

The device of Ref 1 is characterized by 2 wavelengths and the cavities are overlapping. However, when the Ref 1 is modified with Ref 2 the number of wavelengths and the number of non-overlapping cavities becomes limited only by the lengths of the gratings. Therefore, grating length is the result effective variable that

determines the number of output wavelengths and the number of non-overlapping cavities.

It would have been obvious to one of ordinary skill in the art at the time of the invention to make the overlapping gratings that form the cavities long enough to produce at least 8 or at least 15 laser wavelengths and to create at least 5 separate cavities for at least the purpose of obtaining a desired number of output wavelengths.

***Contact Info***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marcia A. Golub whose telephone number is 571-272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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